

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter addresses the direct, indirect and cumulative impacts on elements of the human environment from actions proposed in the CDCA Plan Amendment. This chapter is organized by environmental element, followed by a description and comparison of impacts from the relevant plan element alternatives.

Land use plans, such as the CDCA Plan Amendment, developed in accordance with Title 43 Code of Federal Regulations, provide landscape level decisions for managing the BLM-administered public lands. As a result, the impact analysis for land use plans level actions tends to be cumulative by nature.

4.8 Biological Resources

Impacts to Special Status Species, including threatened or endangered, species proposed for listing under the Endangered Species Act (1973), and BLM State sensitive species (BLM Manual 6840) are assessed in this section.

Wild and Scenic River Eligibility Recommendations. Proposed Plan (Alternatives A, B and C) and No Action (D). The Wild and Scenic River eligibility recommendations have no direct impact on biological resources. Interim management measures for river segments recommended eligible for Wild and Scenic River consideration would provide additional protections, such as no new dams, thereby providing positive benefits for listed species and other biological resources. Numerous special status species (see Appendix B) utilize the riparian areas of the aforementioned eligible river segments. “Wild” rivers areas are free of impoundments, generally inaccessible except by trail (no roads), with watersheds or shorelines essentially primitive and have unpolluted waters. “Scenic” river areas are also free of impoundments, have shorelines or watersheds that are largely primitive and shorelines that are largely undeveloped, they are accessible in places by roads, but the roads generally do not parallel the river. Management protection afforded river segments classified as “wild” or “scenic” would help maintain and preserve quality foraging and breeding habitat for special status species.

For those river segments found ineligible, no new impacts to biological resources would result: most are already in protective status, such as Areas of Critical Environmental Concern and wilderness. Areas already in protective status include the Whitewater River and Mission Creek (San Geronio Wilderness Additions), Palm Canyon (Santa Rosa and San Jacinto Mountains National Monument), and Big Morongo Canyon (Big Morongo Canyon Preserve and ACEC).

The Proposed Plan, in recommending Wild and Scenic River segments as “eligible,” would not have any impacts on special status species or habitats. Designation of Wild and Scenic Rivers is a Congressional action based on information provided to Congress by the land management agency, in this case, BLM.

Visual Resource Management. Proposed Plan (Alternatives A, B and C) and No

Action (D). Visual Resource Management (VRM) classification is a system by which visual impacts of proposed land uses are analyzed. It is not used to assess impacts to habitat or species from ground disturbance, noise disturbance, human disturbances, or other disturbances. The proposal to assign VRM classifications has no impact on special status species or habitats, nor would assignment of interim VRM objectives on a case-by-case basis when projects are proposed.

Land Health Standards. Proposed Plan (Alternatives A, B and C). The Proposed Plan would adopt the Rangeland Health Standards, developed for livestock grazing in consultation with the California Desert District Advisory Council, as Regional Land Health Standards for all BLM lands and programs. This would help maintain biological values on BLM-managed lands in the Coachella Valley planning area. These Land Health Standards address health of soils, native species, riparian and wetland function, and water quality and provide parameters for each element that are applicable to desert ecosystems. Maintenance of native vegetation and control of noxious weeds and exotics would benefit all wildlife species, including Special Status Species. These standards would apply to all BLM-managed lands and would be implemented through terms and conditions of permits, leases, and other authorizations, actions, resource monitoring, assessments undertaken in accordance with BLM's land use plans. Implementation of these standards would reduce the loss of native vegetation and the spread of exotic weeds such as tamarisk and Saharan mustard.

No Action Alternative (D). Under the No Action Alternative, the National Fallback Standards for rangeland health would be adopted. These regional land health standards would apply to all BLM lands and programs and would be implemented through terms and conditions of permits, leases, and other authorizations and land uses undertaken in accordance with BLM's land use plans. These standards also provide guidance for maintenance of biological values on BLM-managed lands. However, the National Fallback Standards lack parameters for meeting the objectives of each element.

Air Quality. Proposed Plan (Alternatives B and C). The Proposed Plan would benefit sand dependent species by maintaining sand sources, and other species by reducing the potential for crushing them and disturbing their habitats through the reduction of vehicular use areas and routes. Special status species affected would include Coachella Valley milk-vetch, Coachella Valley fringe-toed lizard, desert tortoise, flat-tailed horned lizard and a number of sand-dependent insect species. Managing off-highway vehicles in conformance with the Coachella Valley PM10 State Implementation Plan would also benefit species where restrictions on vehicle use would be implemented (e.g., reduction of speed limits on unpaved roads), thereby reducing the potential for direct mortality from crushing. Appendix E, Species Accounts, further describes threats and limiting factors to these species, including those associated with motorized-vehicle use.

Alternative A. Sand dependent species would benefit from the installation of sand fencing by maintaining sand sources. Managing off-highway vehicles in conformance with the Coachella Valley PM10 State Implementation Plan would benefit species where

restrictions on vehicle use would be implemented (e.g., reduction of speed limits on unpaved roads), thereby reducing the potential for direct mortality from crushing.

No Action Alternative (D). Impacts would be the same as described under Alternative A, except that installation of sand fences is not identified in the strategy, thereby increasing potential for adverse effects to sand dependent species.

Multiple-Use Classification. Proposed Plan (Alternatives B and C), Alternatives A and No Action (D). The modification of Multiple-Use Classes or retention of existing designations would have little effect on biological resources. Although Multiple-Use Classes provide broad guidance with respect to permitted uses of the public lands, current laws and regulations (e.g., Wilderness Act and regulations promulgated from the Act), and other actions proposed through this Plan Amendment (e.g., conformance with habitat conservation objectives; designation of special areas [when additional protective measures are developed]; restrictions on motorized-vehicle access, sand and gravel mining, etc.) have a greater effect on species occurring within the planning area.

Habitat Conservation Objectives. Proposed Plan (Alternatives B and C). The Proposed Plan would ensure that all activities allowed by BLM would be in accordance with habitat conservation objectives. This would help maintain biological values on BLM-managed lands within conservation areas, and would provide landscape level conservation of sensitive species. Biological resources, plants, animals, and habitats throughout the planning area would benefit from adoption of these objectives. These objectives, in conjunction with existing land use plans, NEPA, ESA, and BLM Manual 6840, will be used to evaluate the impacts of proposed projects and land use actions on BLM-managed lands in the Coachella Valley Planning Area. Because the BLM-managed lands will be part of the Coachella Valley Multiple Species Habitat Conservation Plan conservation areas, monitoring will occur under the CVMSHCP adaptive management and monitoring program.

Alternatives A and No Action (D). BLM-managed lands within the planning area would be managed in accordance with existing land use plans, NEPA, ESA, and BLM Manual 6840. A landscape level approach to managing public lands would be less clearly defined, thereby increasing the potential for adverse effects to species and habitats.

Fire Management. Proposed Plan (Alternatives B and C). The Proposed Plan would assign fire management categories by habitat type and would benefit biological resources by addressing the relationship of specific habitat types to their natural fire regime. Immediate suppression is a critical element of fire management in desert communities because fire historically has never played a large role in the development and maintenance of these communities. Prescribed fire may be utilized as a resource management tool in very select situations, for example to effectively manage exotic vegetation, enhance habitat values such as openness/visibility for bighorn sheep, or reduce the incidence of senescent vegetation in tortoise habitat. Use of fire in chaparral and montane habitats would help to reduce senescence of native vegetation in these fire dependent habitats. Special status species and habitats would benefit from a

landscape level approach to fire suppression by taking into account the historic fire regime and the response of native vegetation types to fire.

Alternatives A and No Action (D). Absent a landscape perspective for managing fires, vegetative senescence in montane and chaparral communities would likely continue. The site-specific impacts of a prescribed burn would still need to be analyzed in a subsequent environmental review document.

Special Area Designations. Proposed Plan (Alternative A), Alternatives B, C and No Action (D). The Proposed Plan and other alternatives would have no direct impacts on biological resources. The designation of ACECs and Wildlife Habitat Management Areas would provide the basis for establishing additional management measures, such as Habitat Conservation Objectives, which provide guidelines for maintaining natural biological values on BLM-managed lands within these special areas.

Land Tenure: Exchange and Sale Criteria. Proposed Plan (Alternatives B and C). Establishment of land exchange and sale criteria would ensure that all exchanges in the Coachella Valley would benefit the conservation areas and biological resources contained therein. Application of these criteria would implement a landscape level approach to land exchanges and sales by BLM, thus benefiting plants and animals in the planning area.

Alternatives A and No Action (D). Land exchanges and sale would be subject to applicable environmental law and BLM policy. A landscape level approach to land exchanges and sales would be less clearly defined, thereby increasing the potential for adverse effects to species and habitats.

Land Tenure: Acquisition Criteria. Proposed Plan (Alternatives B and C). Establishment of land acquisition criteria would ensure that all acquisitions in the Coachella Valley would benefit the conservation areas and biological resources contained therein. Application of these criteria would implement a landscape level approach to land acquisition by BLM, thus benefiting plants and animals in the planning area.

Alternatives A and No Action (D). Land exchanges and sale would be subject to applicable environmental law and BLM policy. A landscape level approach to land acquisition would be less clearly defined, thereby increasing the potential for adverse effects to species and habitats.

Management of Acquired Lands. Proposed Plan (Alternatives A, B and C). Under the Proposed Plan, newly acquired lands will be managed in accordance with existing management direction and plans. For example, lands acquired within conservation areas will be managed consistent with management guidelines established for the conservation area. This reduces the need for additional planning and provides immediate guidance for conserving biological resources within the conservation area.

No Action Alternative (D). Under the No Action Alternative, newly acquired lands are not subject to the applicable land and mineral laws until an opening order is issued by BLM and published in the *Federal Register* (43 CFR 2091.6 and 2091.8), thus there would be a period of time where no management of biological resources would occur. This would potentially negatively impact special status species.

Communication Sites and Utilities. Proposed Plan (Alternative B). Under the Proposed plan, existing communications sites and wind resource areas would be utilized in a manner that meets Habitat Conservation Objectives, providing protection for biological resources in conjunction with terms and conditions obtained via Section 7 consultation with the USFWS on threatened and endangered species.

Alternative A. Under this alternative, Habitat Conservation Objectives would be used to evaluate new communication site and utility proposals and would provide protection for biological resources in conjunction with terms and conditions obtained via Section 7 consultation with the USFWS on threatened and endangered species.

Alternative C. Under Alternative C, no new communication sites or windparks would be considered within conservation areas. This restriction would conceptually provide additional protections for species within conservation areas. However, windparks, utility lines, and communication sites already exist within confined areas; thus, very little if any additional protections for biological resources would be achieved under this alternative.

No Action Alternative (D). Special status species would still be taken into consideration when evaluating the compatibility of land use proposals on the BLM-managed lands; however, this evaluation would occur on a project-by-project basis, absent a landscape level multi-species management approach and few opportunities for off-site mitigation. Proposed projects would still be subject to NEPA, ESA, and BLM guidance and policy set forth in the Code of Federal Regulation and BLM manual 6840.

Sand and Gravel Mining. Proposed Plan (Alternative B). Under the Proposed Plan, mineral sales would be restricted to State of California Division of Mines and Geology designated resource areas (Figure 2-7). New mining proposals would be subject to the Habitat Conservation Objectives as well as NEPA, Section 7 consultation under the ESA, and other BLM guidance. This would provide protection to special status species and habitats, especially the sand-dependent species such as Coachella Valley fringe-toed lizards, Coachella Valley giant sand treader crickets, Coachella Valley Jerusalem crickets, and flat-tailed horned lizards.

Alternative A. Under Alternative A, saleable mineral extraction would be allowed within conservation areas on BLM-managed lands and outside of Areas of Critical Environmental Concern, only if Habitat Conservation Objectives could be met. Mineral sales would be evaluated on a case-by-case basis in accordance with the CDCA Plan (1980), ESA, NEPA, and other BLM guidance and policy. Species that would potentially be affected by this alternative are the sand-dependent species such as the Coachella Valley fringe-toed lizard, Coachella Valley giant sand treader cricket, Coachella Valley

Jerusalem cricket, and the flat-tailed horned lizard. The application of Habitat Conservation Objectives in the permit process would provide additional protection to sensitive biological resources and special status species.

Alternative C. Alternative C would conceptually provide the greatest amount of protection to special status species and sensitive habitats by closing all BLM-managed lands within conservation areas to saleable mineral extraction. However, sand and gravel mining already exists within confined areas, depending on the quality of material found at a particular site.

No Action Alternative (D). Under the No Action Alternative, mineral sales would be allowed in accordance with the CDCA Plan (1980), NEPA, Section 7 consultation under the ESA, and other BLM guidance, on a case-by-case basis. There would be no specific objectives guiding the protection of special status species and habitats or a landscape-level approach to management of mineral sales.

Livestock Grazing. Proposed Plan (Alternative A). Under the Proposed Plan, grazing on the Whitewater Canyon Allotment would continue as a permitted use until the lessee voluntarily relinquishes the permitted use and preference, at which time the allotment would become unavailable for grazing. Management emphasis would include the compatibility of grazing with conservation objectives of the desert tortoise, arroyo toad, and riparian habitat values. Desert tortoise, arroyo toad, riparian species such as least Bell's vireo, southwestern willow flycatcher, triple-ribbed milkvetch, and other riparian obligates would benefit from this management emphasis.

Alternative B. Adoption of Alternative B would retire the Whitewater Canyon Allotment north of the San Bernardino/Riverside County line. On the remainder of the allotment, BLM would adjust season of use and grazing capacity accordingly. This alternative would provide protection to special status plant and animal species and sensitive habitats in the Whitewater Canyon Allotment area.

Alternative C. Retirement of the Whitewater Canyon Allotment would eliminate potential impacts to desert tortoise, arroyo toad, and riparian habitat values that might result from livestock grazing.

No Action Alternative (D). Under the No Action Alternative, cattle grazing in the Whitewater Canyon Allotment would continue, subject to terms and conditions outlined in biological opinions issued by the U.S. Fish and Wildlife Service on March 14, 1994 and in 1997 addressing desert tortoise, and any additional terms and conditions identified in subsequent biological opinions addressing the arroyo toad, least Bell's vireo, Southwestern willow flycatcher and triple-ribbed milkvetch. All of these species are Federally listed as endangered, and are found or have habitat within the allotment. Through the use of terms and conditions outlined in biological opinions, the likelihood of "jeopardy" is diminished as a result grazing activities. Nonetheless, adverse impacts to native biological resources may occur as a result of grazing activities, if grazing management is not designed to control or minimize effects like accelerated invasion of

exotic grasses, trampling of sensitive and soils, diminished water quality, and diminished proper functioning condition of riparian areas.

In 1999, the BLM conducted Rangeland Health Assessments on the Whitewater Canyon Allotment and found areas not meeting the National Fallback Standards for upland soil permeability, riparian health, and stream morphology. Since 1999, cattle have been temporarily removed from the allotment in order to improve rangeland health. Recent drought conditions have not allowed adequate assessment of possible recovery resulting from the rest period.

Range improvements are a necessary component of grazing management to control and care for livestock and reduce impacts to vegetation and soils from trampling. As conditions change over time, and if resource conditions as measured through trend monitoring and rangeland health assessments dictate, new range improvements may become necessary. These range improvements would be addressed through site-specific environmental and biological assessments.

Wild Horse and Burro Program. Proposed Plan (Alternative B). Both Herd Management Areas (HMAs) would be retired and BLM parcels within and adjacent to the Palm Canyon HMA would be transferred to the Agua Caliente Band of Cahuilla Indians via land exchange, in accordance with the Santa Rosa and San Jacinto Mountains National Monument Act of 2000. The existing horses have been removed and the wild horse died during the summer of 2002 thus reducing grazing pressure on native vegetation and vegetation trampling in sensitive riparian habitats. Competition for forage and water with bighorn sheep has been eliminated, thereby supporting recovery of bighorn sheep in the San Jacinto Mountains. The HMA would be eliminated and there is no plan to restock horses into the HMA area. In addition to benefits for bighorn sheep, other special status species will benefit from retiring these HMAs.

Alternative A. The Palm Canyon and Morongo Herd Management Areas would be retained and levels of occupancy set in accordance with the CDCA Plan (1980). In addition, the Palm Canyon HMA would be established as a grazing allotment for branded horses. This would result in continued grazing pressures on native vegetation, competition for bighorn sheep forage, soil trampling and erosion, impacts to riparian species such as southwestern willow flycatchers, least Bell's vireo, and other special status species, and impacts to water quality. Anza-Borrego Desert State Park reports that feral horses in Coyote Canyon are competing with bighorn sheep for water during the summer months (M. Jorgenson, personal communication). Cumulatively, these impacts would be limited as herd management levels are maintained at 6 horses in Palm Canyon and 16 burros in Morongo.

Alternative C. Both HMAs would be retired and all existing animals removed from BLM-managed lands. This alternative would benefit wildlife and sensitive habitats in the San Jacinto Mountains and a small portion of the Big Morongo Canyon ACEC west of Highway 62. Competition between bighorn sheep and horses for forage and water would be eliminated, as would soil trampling by horses, erosion, water pollution, and

vegetation trampling in sensitive riparian habitats. In addition to benefits to bighorn sheep, other special status species such as least Bell's vireo, southwestern willow flycatchers, and other migrant bird species would benefit from retiring the HMAs.

No Action Alternative (D). Under the No Action Alternative, the HMAs would be retained, thus allowing wild horses and burros to occupy the public lands. Impacts to riparian areas, native vegetation, and special status species would continue to occur.

Motorized Vehicle Area Designations. Alternative A. 3,624 acres of public lands would be designated as off-highway vehicle open areas. Four open areas—located at Windy Point, Indio Hills, Iron Door and Drop 31—would be established. At Windy Point, 777 acres of BLM-managed lands would be designated open for OHV use. Various sand-dependent species would be impacted by this designation. Coachella Valley giant sand treader cricket, CV Jerusalem cricket, CV fringe-toed lizard, CV milkvetch, and Palm Springs pocket mouse are among the special status species that would potentially be affected by the designation of an open OHV area at Windy Point. Additionally, although it is unlikely that bighorn sheep would use the sandy areas of Windy Point, the area is within designated critical habitat for Peninsular bighorn sheep and adjacent to slopes used by bighorn sheep for foraging. Accelerated soil erosion, access into the Santa Rosa and San Jacinto Mountains National Monument, and crushing of native vegetation would occur, as well as direct mortality of special status species.

In the Indio Hills, 833 acres of public lands would be designated as an OHV open area. This area is characterized by sandy hills dominated by creosote scrub. Currently, this area receives use by off-highway vehicle enthusiasts. Potential impacts to special status species including Palm Springs pocket mouse, Palm Springs ground squirrel, flat-tailed horned lizards, include the possibility of direct mortality and habitat destruction (crushing burrows).

At the Iron Door area north of Dillon Road, 643 acres of public lands would be designated as an OHV open area. The area is on the lower slope of alluvial fan, with Joshua Tree National Park to the north, and is dominated by creosote scrub. This habitat may harbor extremely low densities of special status wildlife species, but it is unlikely.

At Drop 31 of the Coachella Canal, 1,371 acres of public lands would be designated as an off-highway vehicle open area. The area would be exposed to accelerated soil erosion and native vegetation loss. Surveys conducted by BLM staff in 2002 revealed no flat-tailed horned lizards or desert tortoise in the area proposed for designation. However, desert tortoise occupy habitat to the east and north of Drop 31. If increases in vehicle activity in this area spilled into protected areas or non-designated areas, impacts desert tortoise would occur as a result of reduction in forage plants, and potential for direct mortality via crushing by vehicles. Other special status species potentially affected by an open area at Drop 31 are the Palm Springs ground squirrel, Palm Springs Pocket Mouse.

In addition, desert bighorn sheep do use the area and habitat adjacent to Drop 31. This population of bighorn sheep also water at the canal and increased use at Drop 31 may reduce the availability of this habitat and water source for sheep. Unauthorized motorized vehicle intrusions into the adjacent wilderness area would disturb desert bighorn sheep and other special status species and possibly discourage access of the Coachella Canal for water. While land managers do not encourage use of the canal by bighorn sheep, there may not be enough drinking sources in the wilderness areas to support the local bighorn sheep population. Implementation of the guzzler installation program proposed through the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan) would provide alternative water sources.

In addition to impacts to wildlife, special status plant species occur in the wash at Drop 31. BLM staff observed Mecca aster during the spring of 2002. Mecca aster grows in arid washes in Riverside County (Hickman 1993). This plant is vulnerable to off-highway vehicle use and was threatened in the Mecca Hills before the establishment of the wilderness area. In 1986, 50-100 plants were observed approximately 1.4 miles south of Sheep Hole Oasis in the Mecca Hills. This area is adjacent to Drop 31 off the Meccacopia Jeep Trail. Isolation of the two significant populations in the Indio Hills and Mecca Hills may reduce genetic diversity. In addition to providing habitat for Mecca aster, triple-ribbed milkvetch may possibly occur at Drop 31, although it has not been observed in the area. Palo verde, smoke tree, mesquite, and ironwood also grow in the wash at Drop 31. The pattern of vehicle use at the site in combination with a lack of representation of all age classes of these species in the wash at Drop 31 may indicate a relationship between vehicle traffic and mortality of younger age classes. Although there have been two years of below-normal rainfall in the desert region, lack of intermediate age classes suggest that drought alone is not the cause of low reproductive success of these plant species at Drop 31. These desert trees may be impacted by OHV use of the Meccacopia Jeep Trail, and an open area style of vehicle use to this area, in combination with increased use pressure over time, could result in increased impacts to these desert wash species.

Prior to any OHV open area designation, site specific surveys would be completed to evaluate the impacts to special status species. ACECs established under prior land use plan decisions would remain closed to motorized vehicles to protect unique biological resources. All other BLM-managed lands within the conservation area would remain “limited” (vehicle access is limited to designated routes and trails), thus providing protection for special status species and sensitive habitats.

In general, the designation of OHV open areas would benefit wildlife species and habitats in the Coachella Valley planning area by focusing intensive use in less-sensitive wildlife/habitat areas, thereby reducing illegal OHV activity in sensitive areas such as the Coachella Valley Preserve.

Proposed Plan (Alternative B). Under this alternative, vehicular “free-play” activities on public lands would not be allowed, thereby protecting sensitive resources from the impacts described above under Alternative A. Working with Riverside County and the

State Division of Parks and Recreation to locate an OHV open area on non-public lands could benefit wildlife species and habitats in the Coachella Valley planning area by focusing intensive use in a less-sensitive wildlife/habitat areas, thereby reducing illegal OHV activity in sensitive areas such as the Coachella Valley Preserve. Establishing a Special Recreation Management Area and managing vehicle use at Drop 31 with an emphasis on use of designated routes is expected to improve habitat conditions at that location.

Alternative C. This alternative provides no off-highway vehicle open areas, thus maximizing protection of native species and their habitats on public lands. The impacts described under Alternative A would be avoided, though use of non-public lands for vehicular free-play activities could increase. Also, efforts to establish an OHV open area on non-public lands would not be undertaken; reduced illegal OHV activity in sensitive areas such as the Coachella Valley Preserve may not be realized.

No Action Alternative (D). The No Action Alternative would provide no off-highway vehicle open areas. The impacts of this alternative would be mixed. On one hand, by not establishing any new open areas, the intensive impacts described under Alternative A would be avoided. Conversely, by not establishing open areas, areas with sensitive resources that are currently being used as “de facto” open areas would continue to be impacted by OHV use.

Motorized Vehicle Route Designations. Various species are particularly sensitive to impacts by motorized vehicles. Flat-tailed horned lizards, desert tortoise, and pocket mice are prone to crushing by vehicles, as well as the burrows of burrowing owl, giant sand treader cricket, Jerusalem cricket, desert tortoise, and round-tailed ground squirrels. Le Conte’s and Crissal thrashers are sensitive to noise disturbance during nesting season, December through June. Uncontrolled off-road motorized-vehicle use results in destruction of native vegetation, including listed plant species, soil compaction, accelerated soil erosion, and destruction of micro-habitats for endemic species like Coachella milkvetch, Little San Bernardino Linanthus, Mecca aster, Coachella Valley grasshopper, and Casey’s June beetle. Extreme temperatures, intense sun, high winds, limited moisture and the low fertility of desert soils make natural recovery of the desert very slow after disturbance (Bainbridge and Virginia 1990). Conditions suitable for plant establishment occur only infrequently and irregularly and it may take hundreds of years for full recovery to occur without active intervention. The impacts of off-highway vehicles have been well documented (Webb and Wilshire 1983) and include damage to soil stabilizers, soil compaction, reduced rates of water infiltration, increased water and wind erosion, and damage to vegetation (Vollmer et al. 1976). In addition, uncontrolled off-road motorized vehicle use may result in the spread of noxious weed species such as salt cedar (*Tamarix ramosissima*).

The level of vehicle use on a road (frequent, occasional, or rare) appears to influence the level of response by bighorn sheep (Papouchis et al. 2000). Frequent vehicle use of a road (for example, Highway 74) creates a barrier to movement of bighorn such that numbers crossing Highway 74 are reduced. Habitat fragmentation caused by heavy

use of roads may result in net loss of habitat used by bighorn sheep (Papouchis et al. 2000). However, bighorn sheep may adapt to occasional use of rural roads, timing their use to coincide with low use levels (Papouchis et al. 2000).

Alternatives A and No Action (D). Seventy-three miles of existing routes on BLM-managed lands would be available for off-highway vehicle use while 70 miles of existing routes would remain closed to protect sensitive biological resources as described above.

Management of vehicle access to the Dunn Road would be primarily for administrative purposes such as flood control, law enforcement, search and rescue, and fire control, rather than research and recreational uses, though permitted commercial jeep tours could occur subject to private landowner permission and consultation with USFWS. According to a Biological Opinion prepared for BLM in 1999, recreational use of the Dunn Road would not be likely to jeopardize recovery efforts of Peninsular bighorn sheep if certain conditions were met such as (1) the amount of time spent on the road was minimized; (2) the number of vehicles allowed per day was held to a strict minimum so that bighorn sheep would have substantial opportunities to cross lower Dunn Road; and, (3) the type of human disturbance was limited to jeeps driving on the road (no stopping or getting out allowed). Access to the Dunn Road for research would enable researchers to collect data on bighorn sheep and other species of plants and animals inhabiting the area. Increased knowledge may increase management options for desert-adapted species such as the desert tortoise, bighorn sheep, and others.

Multiple land owners on the Dunn Road make single-agency management decisions difficult to administer. BLM can manage and patrol the public land portions of the Dunn Road at either end for illegal off-highway vehicle (OHV) use, but absent permission for BLM to access the other public lands through privately owned parcels, illegal OHV use cannot be effectively monitored and will likely continue to occur (BLM files 2002). During 2002, BLM lost access to parts of the Dunn Road due to acquisition of a parcel near Cathedral City Cove by a private citizen. Prior to that, BLM patrolled the road regularly for illegal OHV use and compliance was reasonable. However, since BLM has lost access through the private parcel, illegal OHV use has increased. Motorcycles and all terrain vehicles have been observed accessing Dunn Road via the Goat Trails area of Palm Springs, and plant damage has been noted by BLM staff (BLM files 2002). This activity is unpredictable in location and timing and as such is more likely to impact bighorn sheep than regular patrols.

Current levels of use are apparently not enough to prevent bighorn sheep from crossing or using habitat adjacent to Dunn Road; thus, these levels are probably not a source of habitat fragmentation. Peninsular Ranges bighorn sheep have been observed on and adjacent to the Dunn Road during the past two years (BLM files) and historically used Cathedral Canyon for lambing and rearing and for water (K. Brennan personal communication). Cathedral Canyon currently is the northwestern-most lambing area in the Santa Rosa Mountains. Lambs have been documented in Cathedral Canyon in 1995 and 1997 (USFWS 1999). Bighorn sheep may habituate to regular, predictable

uses and exhibit less response less to such uses (Geist 1971, Papouchis et al 2000).

Proposed Plan (Alternative B). Forty-seven miles of routes would be available for off-highway vehicle use and 96 miles of routes would be closed. This alternative would provide additional protections for sensitive biological resources as described above.

Impacts to biological resources from proposed management of Dunn Road would be the same as described under Alternative A.

Alternative C. Twenty-seven miles of routes would be available for off-highway vehicle use, which would noticeably reduce motorized vehicle access opportunities and minimize disturbance of any kind in a variety of habitats. This alternative would provide the least potential for impact to sensitive species. It is possible that displaced use may have a greater impact on sensitive biological resources at other locations than use of the existing route network.

This alternative would allow BLM-managed portions of the Dunn Road to naturally reclaim over time. This alternative, while on the surface appears to reduce impacts to bighorn sheep, may in fact, cause greater impacts to sheep. Lack of management presence on the Dunn Road following denial of access to BLM across a privately-owned parcel has resulted in increased illegal OHV activity on Dunn Road which potentially impacts bighorn sheep (see discussion under Alternative A).

Special Recreation Management Area. Proposed Plan (Alternative B), Alternatives A and C. No direct impacts to biological resources would occur as a result of establishing a Special Recreation Management Area. The designation, however, would provide the basis for establishing additional management measures through preparation of a Recreation Area Management Plan (RAMP) in order to better protect biological values in this area, such as desert bighorn sheep, while enhancing recreational opportunities in the area. Four guzzlers are proposed through the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan) to be installed in the Orocopia Mountains Wilderness; two would be authorized through the NECO Plan Record of Decision (anticipated in 2002) with the other two being constructed only with further justification, i.e., if additional biological information is provided. The objective is to discourage bighorn sheep from using the Coachella Canal for water and to make better use of the entire range.

No Action Alternative (D). Management of recreational uses in the Mecca Hills and Orocopia Mountains area would be consistent with existing prescriptions and those adopted through the NECO Plan. A basis for establishing additional management measures through a RAMP would not be established. Installation of guzzlers would be subject to decisions made through the NECO Plan (see discussion under the Proposed Plan).

Stopping, Parking and Vehicle Camping. Limiting parking within conservation areas would minimize potential conflicts with multi-species habitat conservation.

Proposed Plan (Alternatives A and B). Stopping, parking, and vehicle camping would be allowed within 100 feet from the centerline of an approved route except where fenced. The intent of this decision is to minimize vehicle activities off established routes. This in turn, will minimize soil erosion, breaking down banks, crushing of sensitive plant species, and potential impacts to special status species.

Alternative C. Stopping, parking, and vehicle camping would be allowed within 300 feet from the centerline of an approved route except within ACECs and conservation areas where the limit would be 30 feet for stopping and parking. Vehicle camping within conservation areas would be not allowed. The intent of this alternative would be to further reduce vehicle activities off established routes, thus further minimizing soil erosion, breaking down banks, crushing of sensitive plant species, and potential impacts to special status species.

No Action Alternative (D). Stopping, parking, and vehicle camping would be allowed within 300 feet of a route of travel except within ACECs where the limit would be 100 feet. This alternative would not provide as much protection for sensitive habitats or special status species as the other alternatives. Banks along washes would be subject to being broken down by vehicle traffic, tortoise burrows could be crushed, as well as impacts to other special status species.

Peninsular Ranges Bighorn Sheep Recovery Strategy. The proposed Recovery Strategy for Peninsular Ranges bighorn sheep emphasizes restoration of public lands and coordination of conservation efforts with the U.S. Fish and Wildlife Service, California Department of Fish and Game, local jurisdictions, and non-government organizations to promote recovery of bighorn sheep. A combination of habitat improvement projects, management of land uses to avoid, reduce, or mitigate disturbance, and excluding bighorn sheep from the urban environment is proposed. The *Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS 2000)* was used in the development of this strategy.

Land Use Plan Decisions Common to All Alternatives

Objective A: Restore and manage habitat to promote recovery of bighorn sheep

- Habitat loss is the leading cause of species endangerment and the leading threat to global biodiversity (Groombridge 1992, Noss et al. 1997). An estimated 18,500 acres of suitable bighorn habitat has been lost to urbanization and agriculture along the urban interface between Palm Springs and La Quinta (USFWS 2000). Development of private lands continues along the valley-mountain interface and habitat acquisition would benefit bighorn sheep by minimizing habitat fragmentation and loss.
- Bighorn sheep rely on keen vision and open habitats to detect and evade

predation (Risenhoover and Bailey 1985, Giest 1971). Vegetation encroachment reduces visibility and may result in a net loss of bighorn habitat (Fairbanks et al. 1987, Etchberger et al. 1989, Gionfriddo and Krausman 1986). The rate of vegetation change in the western United States has been unprecedented during this century (Miller and Wigand 1994) with fire suppression playing a major role in vegetation change over time (Miller 1999). An effective fire management program will help maintain bighorn sheep habitat in the Peninsular Ranges by minimizing encroachment and composition change in vegetative communities.

- Invasive plant species, including tamarisk, arundo, and fountain grass degrade bighorn sheep habitat. Some of the effects of invasive plants on the quality of bighorn sheep habitat include competition with native plants for water and resulting changes in hydrologic regimes and out-competing native grasses and shrubs for space, resulting in poorer quality forage. A comprehensive approach to invasive plant species management and eradication will benefit bighorn sheep and other species as well, including neotropical migrant songbirds, desert slender salamander, and others. Tamarisk eradication may result in immediate reappearance of surface water (Barrows 1994, T. Egan 2001 personal communication), which may help expand bighorn sheep distribution.

Bighorn distributions in the Peninsular Ranges have been linked to water sources. Cunningham and Ohmart (1988) found that bighorn sheep were more likely to be found near water in the Jacumba Mountains, and Blong (1967) reported bighorn sheep using Magnesia Canyon Springs consistently. Tamarisk infestations in Magnesia and Cathedral Canyons have been treated in the past with good results. Follow-up treatments are scheduled for fall 2002. During the lambing and rearing season (approximately January through June), ewes increase their intake of water to help meet demands of lactation. Generally, ewes and lambs are found within 2 miles of water. In the Peninsular Ranges, most water sources are ephemeral. Natural tanks, or tinajas, are filled by run-off from winter and spring rains and then dry up during the hot summer months.

Objective B: Manage land uses to avoid, reduce, or mitigate disturbance

- Fixed-winged aircraft have little or no impact to sheep above 100-m (Krausman and Hervert 1983). However low-level aircraft flights may have an impact on sheep. Anza-Borrego Desert State Park has reported that low-level military overflights cause flight in bighorn sheep (Mark Jorgenson, personal communication). In addition, stress and behavioral changes have been documented to result from the use of helicopters for annual population surveys and captures. Heart rate, body temperature, energy expenditures, hormone levels and blood pressure have been shown to elevate during helicopter pursuit and subsequent capture of

bighorn sheep (MacArthur et al., 1986, Martucci et al., 1992, Kock et al., 1987). In addition, temporary disruption of normal movement and social patterns occurs. Bighorn may shift habitat use which may bias estimates of habitat use, (Bleich et al. 1994), population size (Bleich et al. 1990), and home-range size (Miller and Smith 1985).

- Habitat fragmentation can be characterized as a break up of a continuous landscape containing large patches into smaller, usually more numerous and less-connected patches. Heavy road use may fragment bighorn habitat and interfere with movement patterns (Papouchis et al. 2000, Jorgensen 1974, Leslie and Douglas 1980, Miller and Smith 1985). Miller and Smith (1985) documented that 25% of bighorn sheep (45 out of 180 observations) immediately reacted to a parked jeep or truck by either walking or trotting away and returning to their original activity within 10 minutes, or by running away from the area and not returning to their original activity. Jorgensen (1974) documented bighorn sheep avoiding a water source during weekends when vehicle use of the area adjacent to the water sources was high. Rubin et al. (1998) proposed that construction and use of roads may have increased the fragmentation of ewe distributions in the Peninsular Ranges. Four of the boundaries between the 8 ewe groups described coincided with paved roads (Highway 74 in the Santa Rosa Mountains, road S-22 in the San Ysidro Mountains, Highway 78 between the San Ysidro and Vallecito Mountains, and road S-2 between Carrizo Canyon and the Vallecito Mountains. Ewes have been documented crossing Highway 74 during the 1970s by California Department of Fish and Game biologists (Rubin et al. 1998) and by Bureau of Land Management staff in 2001 and 2002. Rams have been documented crossing Highway 74 more frequently.

Roads that occur on BLM-managed lands within the planning area and designated critical habitat are Dunn Road and Martinez Canyon wilderness cherry stem. It is unlikely that current or proposed management strategies of these routes result in habitat fragmentation based on the fact that bighorn sheep continue to cross Dunn Road and use Martinez Canyon. Dunn Road is, and proposed to remain, open to authorized access only and Martinez Canyon is a route that requires 4-wheel drive, high clearance vehicles.

- Public information and awareness is a critical component in the recovery of threatened and endangered species and efforts to prevent future listings. Effective outreach programs increase the public's knowledge of the niche that a species occupies and the relationship between the human environment and the wildland environment.
- Publishing an annual report that describes management actions, monitoring results, and management implications of research conducted

on BLM-managed lands will provide information back to the public regarding bighorn sheep recovery efforts. It is critical that the public be engaged in the recovery process, increasing effectiveness of recreation management, creating partnerships in habitat restoration, increasing awareness of mortality factors such as poisonous plant ingestion (oleander) and helping managers find creative ways to reduce urban-related mortalities.

- Mountain lion predation on bighorn sheep can have a significant impact on small populations (Wehausen 1996) and is cited as one of the primary mechanisms driving the decline of bighorn sheep in the Peninsular Ranges (USFWS 2000). Sixty-nine percent of 61 mortalities of radio collared sheep from 1992 to 1998 between Highway 74 in the Santa Rosa Mountains and the Mexico border are attributed to mountain lions (Hayes et al. 2000). Efforts are currently underway in Anza-Borrego Desert State Park to evaluate the interrelationships among mountain lions, bighorn sheep, and mule deer. Between September 2001 and April 2002, 4 radio-collared bighorn sheep and one non-radio-collared sheep have been killed by mountain lions. An additional 4 radio-collared and 5 non-radio-collared sheep were likely killed by mountain lions, although researchers are not 100% certain.

Mountain lions have an impact on bighorn sheep populations in the Peninsular Ranges. Predator control is outlined in the bighorn recovery plan in accordance with the recovery criteria established in the recovery plan. The first level of predator control is essentially emergency actions taken to protect small subpopulations from extinction. The Recovery Plan states that removal of lions should be selective and only target individual lions known to be, or suspected of, preying on bighorn sheep. According to the USFWS, predator removal would be implemented if there are fewer than 15 adult female bighorn sheep in a given recovery region and predation is a known mortality factor. Predator removal may also be implemented if there are greater than 25 ewes in each of the 9 recovery units, to further facilitate the long-term goals of population recovery. Lion removal should only occur if lion predation is the primary cause of mortality and low survivorship is determined to be limiting population recovery. Monitoring is an important component of any predator control program, in addition to habitat evaluation to determine if predator control achieves the desired result (i.e. less predation on bighorn sheep). Because nearly 28% of habitat in the Peninsular Ranges is managed by the BLM, a multiple agency approach is necessary for the most effective management and control of predators.

Objective C: Manage bighorn sheep populations to promote recovery

- Augmentation and reintroduction programs are recognized conservation

tools and have been used extensively to manage bighorn sheep populations (Bleich et al. 1990, Ramey 1993). However, these tools should be used in support of other conservation measures (USFWS 2000). Additionally, decisions regarding augmentation and reintroduction need to consider the consequences to genetics, disease, and population structure. Reintroduction and augmentation may be used to re-establish ewe groups and restore connectivity among neighboring groups. Augmentation may play an important role in conservation of bighorn sheep because habitat use patterns are learned from experienced animals. Bighorn sheep are generally poor colonizers of available habitat because habitat use patterns are learned from experienced animals (Geist 1967). Once ewes discontinue use of a particular area, it may be difficult for inexperienced sheep to establish in this area.

Alternative A.

Objective A: Restore and manage habitat to promote recovery of bighorn sheep

- Bighorn distributions in the Peninsular Ranges have been linked to water sources. Cunningham and Ohmart (1988) found that bighorn sheep were more likely to be found near water in the Jacumba Mountains, and Blong (1967) reported bighorn sheep using Magnesia Canyon Springs consistently. During the lambing and rearing season (approximately January through June), ewes increase their intake of water to help meet demands of lactation. Generally, ewes and lambs are found within 2 miles of water. In the Peninsular Ranges, most water sources are ephemeral. Natural tanks, or tinajas, are filled by run-off from winter and spring rains and then dry up during the hot summer months. Tamarisk has invaded many natural springs and areas around tinajas in the Peninsular Ranges, reducing water availability for bighorn sheep. Eradication of tamarisk enhances the availability of water and may prevent the necessity of installing artificial water sources. Tamarisk eradication can result in immediate reappearance of surface water (Barrows 1994, T. Egan 2001 personal communication) that can help expand bighorn sheep distribution.

The installation of artificial water sources would have a number of impacts, both positive and negative, on bighorn sheep. On the positive side, year-round water would be provided for bighorn sheep, facilitating range expansion and increase in local populations. From a negative standpoint, artificial water sources in desert environments may provide breeding areas for disease vectors such as *Culicoides* sp. (Mullens et al. 1992). Additionally, *Elaeophora schneiderii* has been detected in desert bighorn sheep in New Mexico and it has been suggested that water sources in desert environments provide a breeding ground for the horsefly that is the vector for this disease (Boyce et al. 2000). Desert-dwelling species have

evolved in extremely arid environments and have adapted to the stochastic nature of water availability in the desert. By providing artificial sources of water for desert dwellers, including bighorn sheep, it may reduce, over time, the ability of these species to survive long-term drought, (Broyles 1995, Broyles and Cutler 1999). Finally, predation may increase as a result of installing an artificial water source (DeStephano, Schmidt, deVos 2000). Long-term monitoring and research indicates that predators such as mountain lions hunt in and around water sources. A permanent water source may attract mountain lions and cause increased predation on bighorn sheep. In addition to mountain lions, coyotes and bobcats are known to prey on lambs and yearling bighorn sheep thus impacting recruitment.

The connection between increased water availability and increased wildlife populations is unclear (Broyles and Cutler 1999). Krausman and Etchberger (1995) did not detect an increase in productivity of mountain sheep in the Little Harquahala Mountains in Arizona when water catchments were added; in fact, survival decreased. Smith and Krausman (1988) suggested that bighorn sheep likely existed for thousands of years without free water, and although densities are low, their number may be within constraints of available resources.

Development of artificial water sources requires a major commitment of funds and labor; however, the literature fails to establish a cause and effect relationship between additional water sources and increased wildlife populations (deVos and Clarkson 1990). Researchers suggest that installation of new waters be carefully considered. Smith and Krausman (1988) recommend that before adding water to bighorn habitat, the need for water should be well established. Lee (1993) suggested that bighorn sheep in Mexico are doing well without water development while in the United States populations continue to decline despite a massive water development program over the past 3 decades.

Objective B: Manage land uses to avoid, reduce, or mitigate disturbance

- Research tells us that ewes are more sensitive to disturbance during the lambing season (Geist 1971, Turner and Hansen 1980, Light and Weaver 1973, Wehausen 1980). The Recovery Plan for Peninsular Ranges Bighorn Sheep (USFWS 2000) recommends that disturbance be minimized to the extent practical during lambing season, including reductions or elimination of trail use and use of non-paved vehicle routes. The BLM has implemented a voluntary avoidance trails management program during the past 3 years. This program asks the public to avoid using certain trails during the lambing and hot season to protect bighorn sheep during these sensitive seasons. Compliance with this voluntary program has been good and has improved across all years (BLM files).

During the 2001 trail season (January – June for lambing and July 1 – September 30 for hot season), compliance was estimated at 61% for all trails and user groups. Because of the multiple jurisdictions involved, BLM is participating in the development of a trails management plan that would provide recreation opportunities while also protecting bighorn sheep during sensitive seasons. This plan will be released as part of the Coachella Valley Multiple Species Habitat Conservation Plan. BLM is not addressing trail use in this Plan Amendment but deferring those decisions to the CVMSHCP decision-making process.

The use of helicopters in big game management and research has been well documented (Thompson and Baker 1981). Bighorn sheep equipped with radio or satellite collars provide critical information on habitat use, distribution, movements, and home range size of individual animals. This information is critical for management and recovery of bighorn sheep in the Peninsular Ranges. However, such use is not without cost to the animals. Pursuit and capture of wild ungulates causes intense, short-term stress to the animals. Heart rate, body temperature, energy expenditure, hormone levels, and blood pressure have all been shown to elevate under stress (MacArthur et al., 1986, Martucci et al., 1992, Kock et al., 1987). Capture-related mortality is generally between 1-2% of the animals captured (Ramey personal communication 2002). During the 2001 collaring operations at Anza-Borrego Desert State Park, one bighorn sustained a broken leg in the course of being captured and was euthanized by state veterinarians. In addition, some temporary disruption of normal movement and social patterns would occur. Sheep not captured, but near a capture area, may also experience stress and habitat shifts due to helicopter disturbance (Bleich et al. 1994). Krausman and Hervert (1983) found that bighorn sheep at Cabeza Prieta National Wildlife responded to aircraft flying below 100-m but that above 100-m no response was detected.

Bighorn population surveys are conducted via helicopters because the aircraft must be close enough to the animals for the observers to determine sex and age. Aerial surveys of collared sheep from helicopters may induce short-term stress and cause temporary shifts in habitat use (Bleich et al. 1994), potentially biasing estimates of habitat use and distribution (Bleich 1993), population size (Bleich et al., 1990), and home-range size (Miller and Smith 1985). Bleich et al., (1994) cautioned investigators to consider the potential effects of aerial sampling on the condition and perhaps reproductive success of large mammals (Murphey et al., 1993 cited in Bleich et al., 1994). Although capture indisputably does cause stress and habitat displacement to bighorn sheep, most captured and collared sheep appear to have few, if any, long-term effects from the capture. Sheep generally resume normal feeding, movement,

activity patterns, and social status within a few days of helicopter surveys or capture.

Causes of lamb mortality are poorly understood. Capturing, collaring, and monitoring bighorn lambs provides cause-specific mortality data. These data could be used to detect diseases, predation, and urban interface issues, which may limit recruitment and thus impede recovery. Lambs may be more vulnerable to capture and handling related stress than adults due to their age and inexperience. Rates of post-capture lamb mortality could be influenced by capture and handling by increasing susceptibility to disease, predation, injury, and potential abandonment by ewe. During a four-year lamb mortality study conducted by the Bighorn Institute and the California Department of Fish and Wildlife, there have been no mortalities directly associated with capture of lambs. Additionally, there is no evidence that there have been any interruptions in suckling bouts or abandonment by ewes during this study to date (Bighorn Institute unpublished data). This population has experienced high lamb mortality for over a decade, and the causes need to be identified. The risks associated with capture of lambs may be counterbalanced by the quality of information collected.

Objective C: Manage bighorn sheep populations to promote recovery

- Excluding sheep from the urban areas is an important component of recovery (Bighorn Institute 2000, USFWS 2000). Bighorn sheep in the Santa Rosa Mountains have come down to water at golf courses and homes along the urban-wildland interface for the past 30 years (Blong 1967, Bighorn Institute 1999). The knowledge of these sources of food and water are passed each year to successive generations of bighorn sheep. Threats in the urban interface include poisonous plants such as Oleander, a popular exotic plant used for landscaping, drowning in swimming pools, encounters with domestic dogs, and automobile collisions. Fences impact bighorn sheep by cutting off access to food and water. Eradication of tamarisk and improvement or construction of additional water sources should occur prior to completion of a fence project so that bighorn sheep are not left high and dry during critical periods of time. Fences would be constructed in coordination with USFWS and CDFG to ensure minimal impact to sheep wherever there is a demonstrated or potential problem with sheep using urban sources of food and water. This could result in fence being constructed in areas where there is no demonstrated problem or in fences being constructed before resource needs such as forage and water have been addressed.

Proposed Plan (Alternative B).

Objective A: Restore and manage habitat to promote recovery of bighorn sheep

- The impacts described under Alternative A would also apply to Alternative B. The primary difference between these two alternatives is that Alternative A would rely primarily on habitat restoration techniques and Alternative B would provide for strategic development of artificial water on public land if necessary for recovery of bighorn sheep. In addition, research would be permitted on public lands with few constraints placed on subject or methods.

Objective B: Manage land uses to avoid, reduce, or mitigate disturbance

- The impacts described under Alternative A, above, would also apply to Alternative B. The difference between these two alternatives is that Alternative A would rely on voluntary restrictions and Alternative B would rely on a combination of voluntary, non-voluntary seasonal restrictions, and stipulations and mitigations attached to permits issued by BLM for activities on BLM-managed lands. Research with strong management implications would be encouraged, thus benefiting sheep by providing information for recovery efforts.

Objective C: Manage bighorn sheep populations to promote recovery

- Same as alternative A except that fence would only be constructed in areas where there is a demonstrated problem with sheep using urban areas for food and water and confidence that a fence would effectively address the problem. In addition, no fences would be constructed on BLM-managed lands until adequate water had been provided or shown to be present.

Alternative C

Objective A: Restore and manage habitat to promote recovery of bighorn sheep

- Working with the USFWS, CDFG, and private landowners, BLM would implement a water installation program to provide water across the range for bighorn sheep. Impacts of artificial water installation are discussed under Alternative A.

Objective B: Manage land uses to avoid, reduce, or mitigate disturbance

- The impacts described in Alternative A would be largely curtailed under Alternative C through a variety of mechanisms including trail closures, restriction of administrative and permitted activities (such as patrolling,

research) would be restricted to the minimum necessary to protect and monitor bighorn sheep. These restrictions would increase protection for sheep during the sensitive seasons of lambing and summer.

Objective C: Manage bighorn sheep populations to promote recovery

- Same as Alternative A except that fence construction would only be allowed where there is a demonstrated problem *and* if the public land portion is critical to completion of the fence and recovery.

No Action Alternative (D).

Objective A: Restore and manage habitat to promote recovery of bighorn sheep

- On-going tamarisk eradication efforts would result in increased water availability for bighorn sheep. Artificial water installation would be considered case-by-case and would have the same potential impacts described in Alternative A.

Objective B: Manage land uses to avoid, reduce, or mitigate disturbance

- Discretionary land uses, including recreation, research, and monitoring may be considered on a case-by-case. Impacts described in the Alternatives above may occur.

Objective C: Manage bighorn sheep populations to promote recovery

- Fence construction would be considered on a case-by-case basis. Impacts described in Alternative A would potentially occur.
- Public lands may be considered for reintroduction, augmentation, or predator control after NEPA analysis, Section 7 consultation under the ESA, and public comment.

Hiking, Biking, and Equestrian Trails. Proposed Plan (Alternatives A, B and C). A multiple agency, multiple jurisdiction trails management plan will increase the effectiveness of managing trails in the Peninsular Ranges because of the checkerboard pattern of landownership. Limitations on trail use during the lambing season and/or hot summer months would benefit bighorn sheep by reducing the overall level of disturbance to sheep (see also alternatives above).

No Action Alternative (D). New trails would be developed under current Federal law and regulation. Impacts to bighorn sheep would be assessed for each specific project proposal.